

Fig. 11 – OCN Turbo shaft Engine – Example

Net Power=630 kW; $n_1=54,000$ rpm; $n_2=45,000$ rpm
 $G=2.7$ Kg/sec; Compressor P.R.=16; $T_{combustor}=1260^\circ\text{K}$; Thermal Efficiency=35%

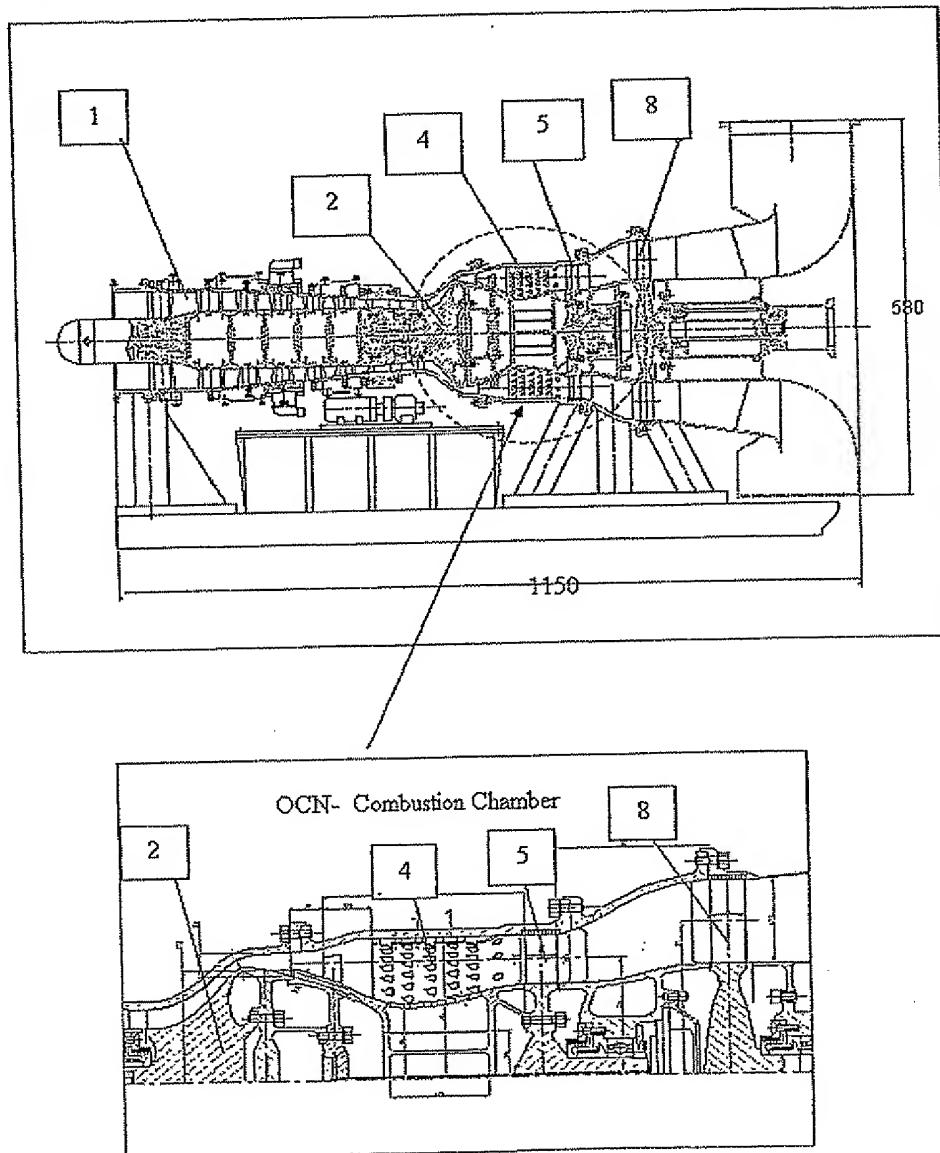
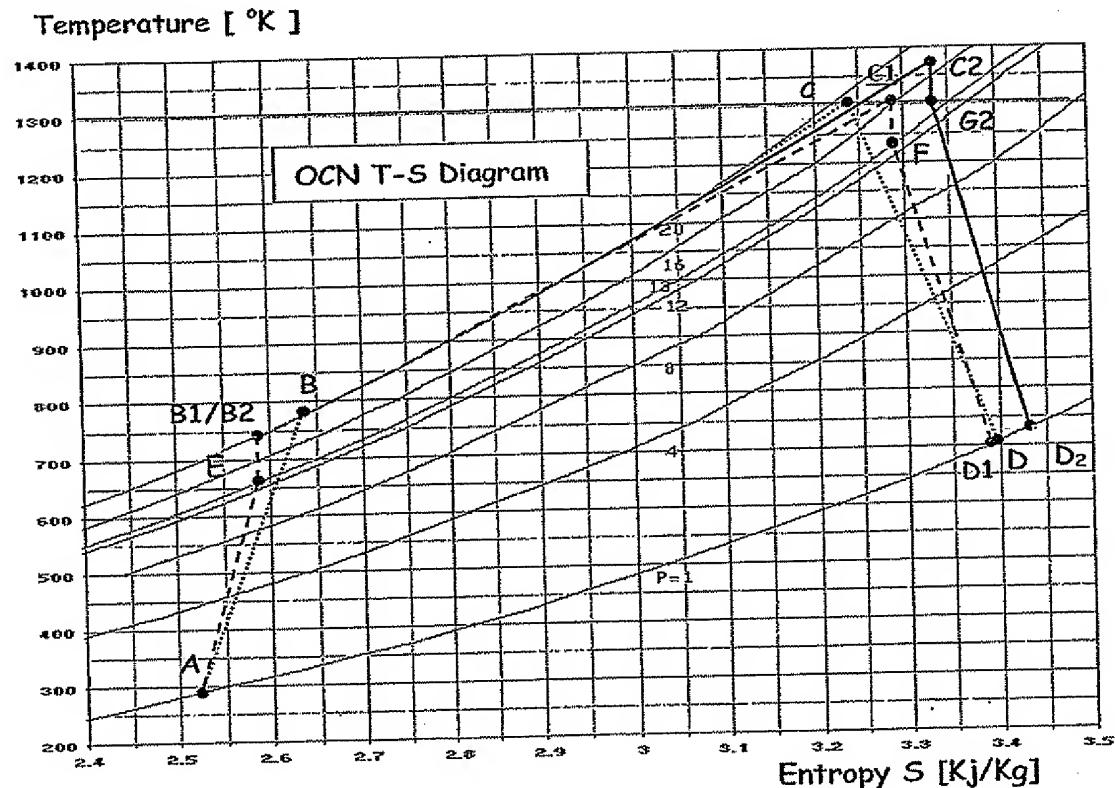


Fig. 12 - OCN T-S Diagram

line style	Cycles	Efficiency	Power	η_c	η_t
.....	Conventional = A-B-C-D	29%	181 kW	80%	87%
- - -	OCN, $T_f = 1300^\circ K = A-E-B1-C1-F-D1$	34%	210 kW	85%	92%
—	OCN, $T_R = 1300^\circ K = A-E-B2-C2-G2-D2$	35%	256 kW	85%	92%

Compressor P.R = 20; $u = 500$ m/sec; $C_u = 400$ m/sec.



A	B	B1,B2	C	C1	C2	D	D1	D2	E	F	G2
T °K	288	777	748	1300	1300	1370	707	702	731	668	1230
P Bar	1	20	20	19.5	15.5	16	1	1	1	13	13

Fig. 13 O.C.N THERMAL EFFICIENCIES

Design point analysis

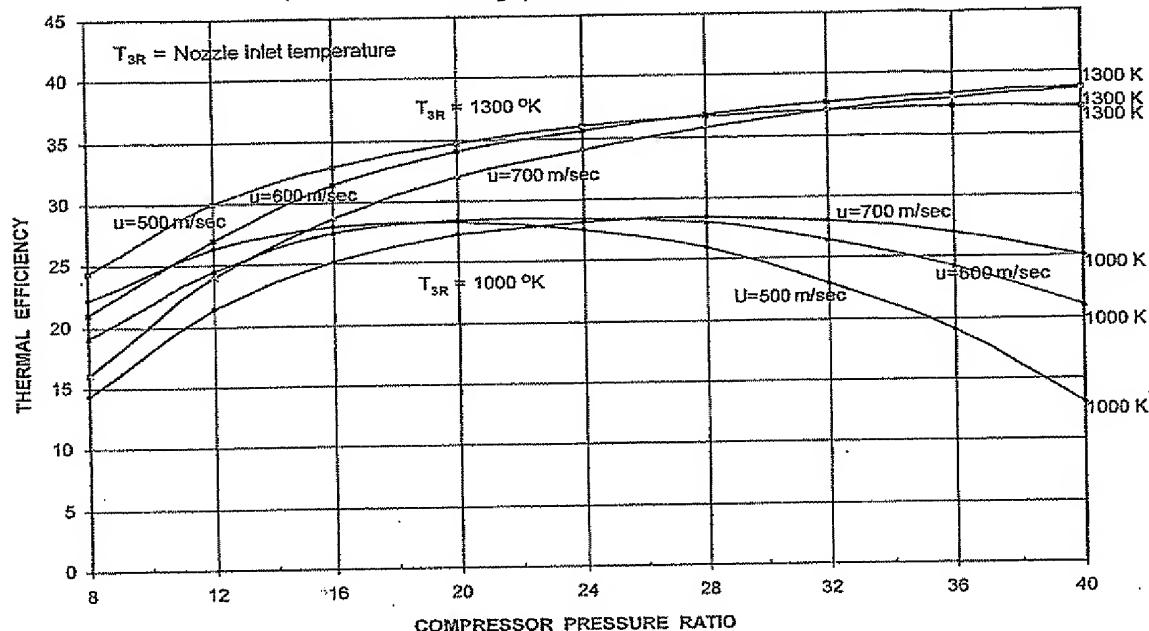
 $Cu = 0.8U$ 

Fig. 14 O.C.N SPECIFIC POWER

Design point analysis

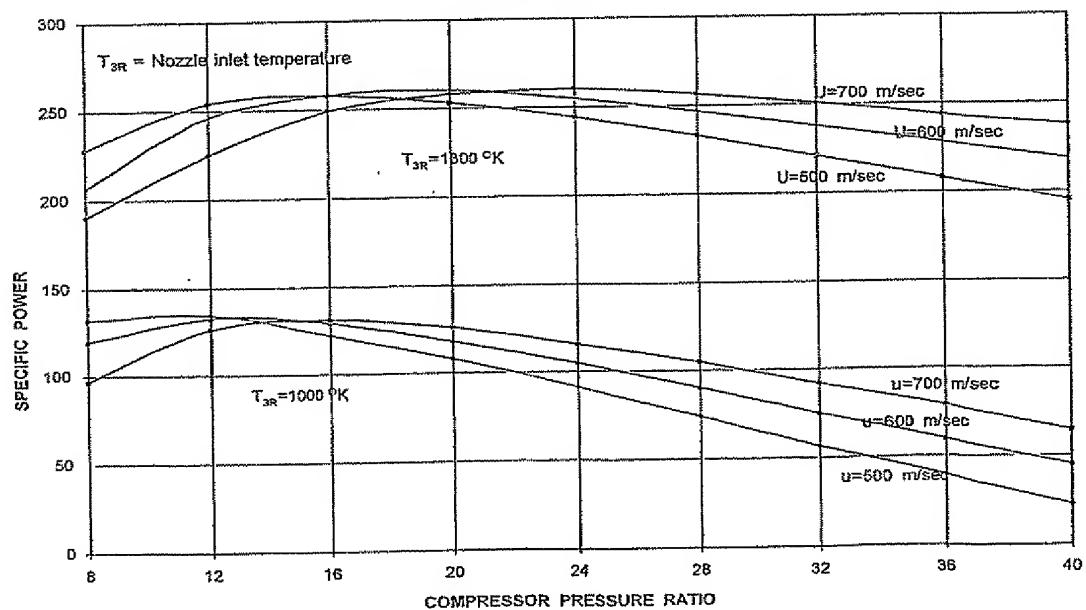
 $Cu=0.8U$ 

Fig. 15 - O.C.N AND CONVENTIONAL GAS TURBINE SPECIFIC POWER

P.R=20 U=500 m/sec Cu =400 m/sec

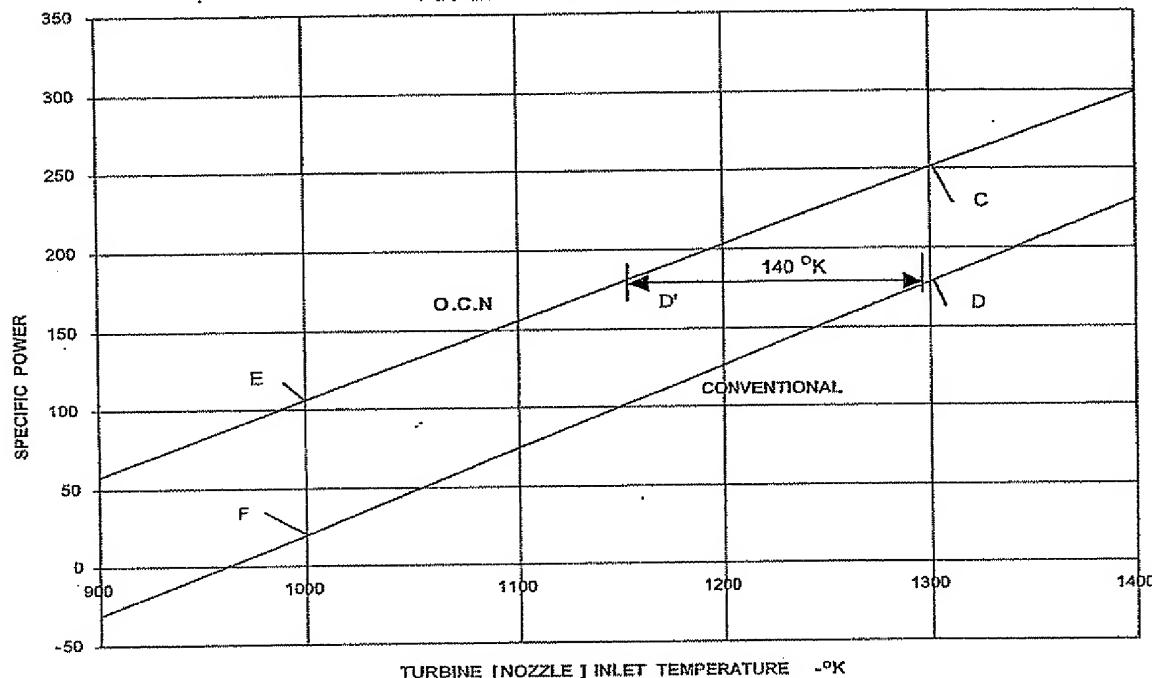


Fig. 16 - O.C.N AND CONVENTIONAL GAS TURBINE EFFICIENCY

P.R=20 U=500 m/sec Cu=400 m/sec

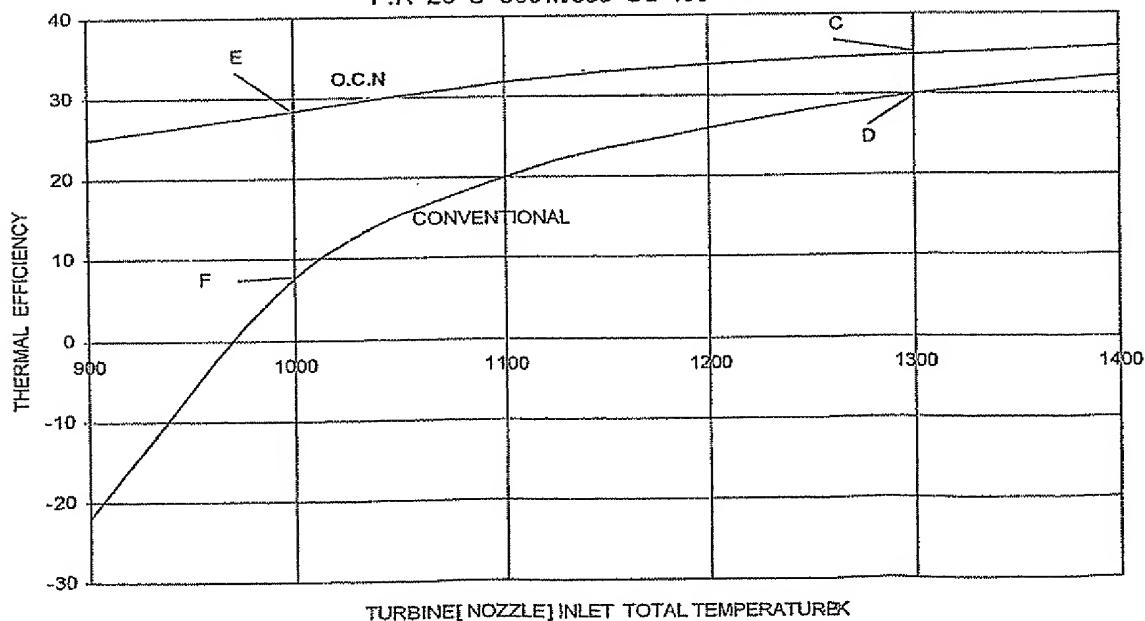


Fig. 17 O.C.N TURBOFAN S .F.C.

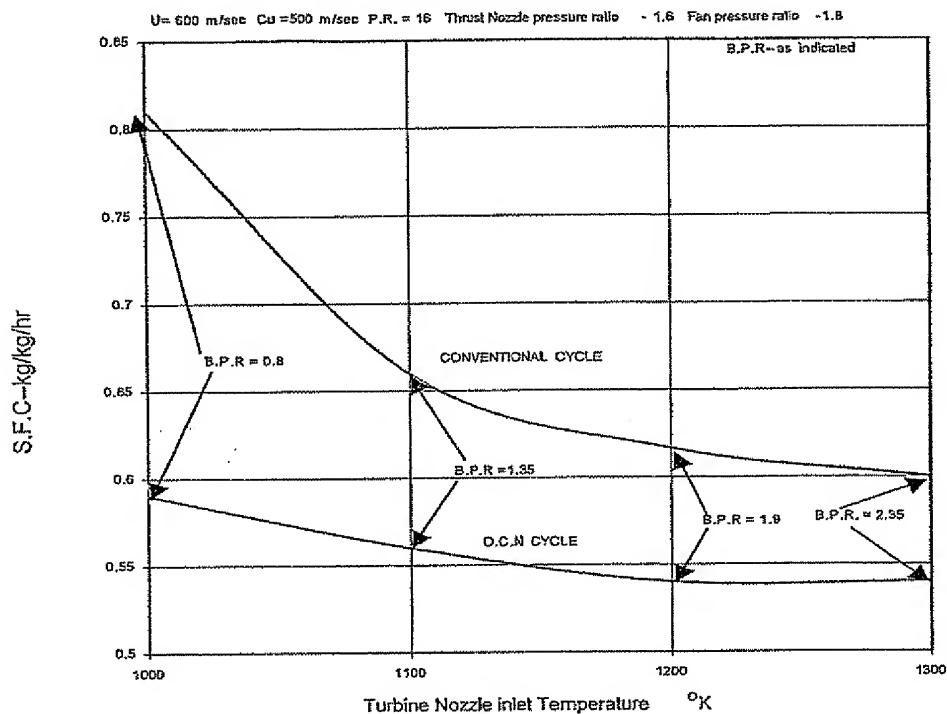


Fig. 18 O.C.N TURBOFAN THRUST

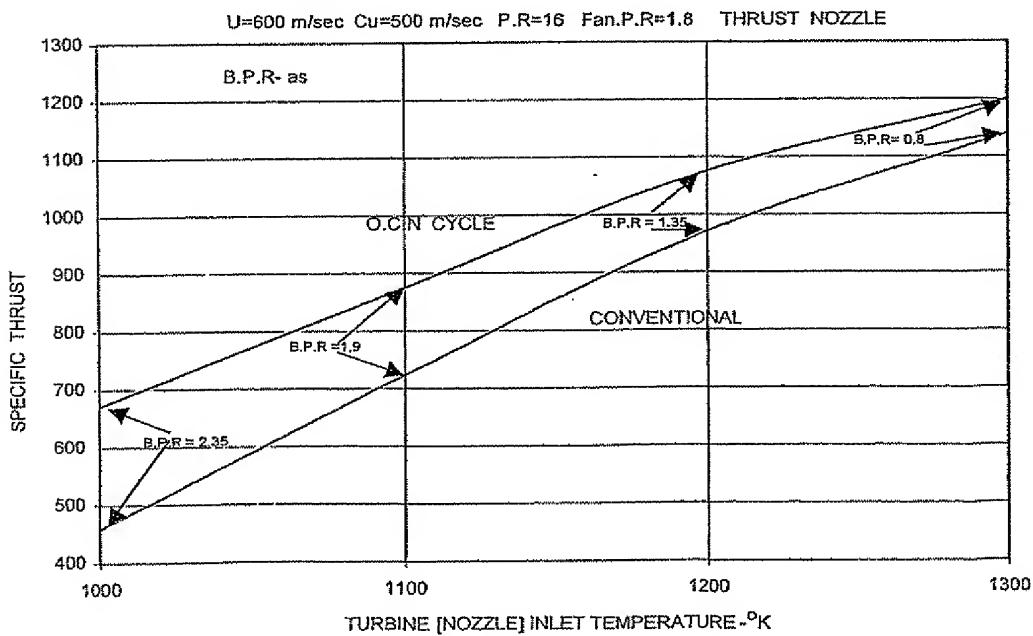
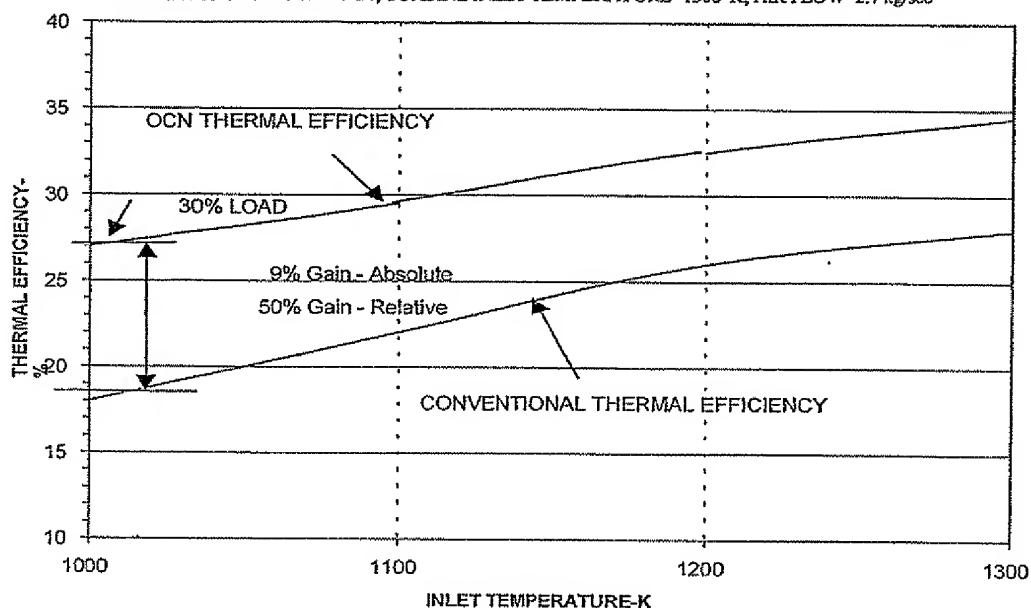


Fig. 19 – EFFECT OF PART LOAD ON THERMAL EFFICIENCY

OCN DESIGN POINT: C.P.R.=24; TURBINE INLET TEMPERATURE=1300°K; AIR FLOW=2.7 kg/sec

**Fig. 20 EFFECT OF PART LOAD ON POWER**

OCN DESIGN POINT C.P.R.=24; TURBINE INLET TEMPERATURE=1300°K; AIR FLOW=2.7 kg/sec

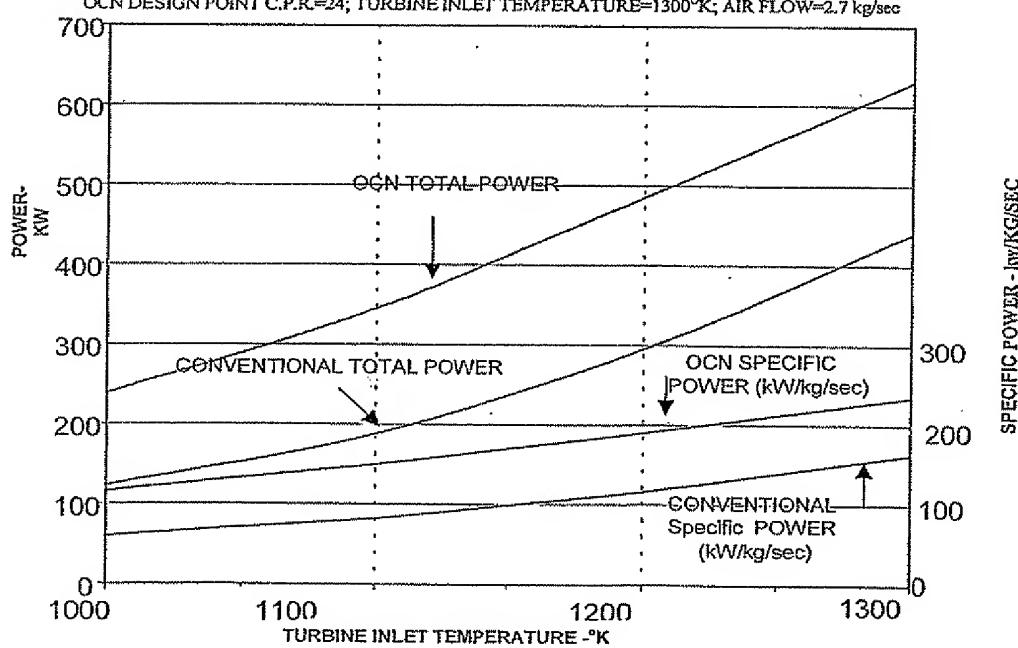


Fig 11. Velocity Triangles

$$U=U_2=U_3=U_4$$

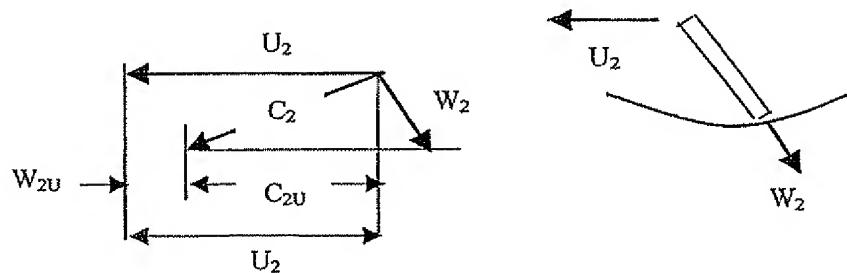
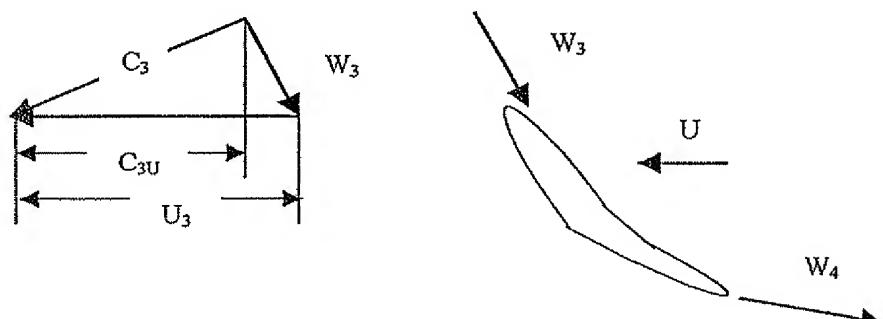
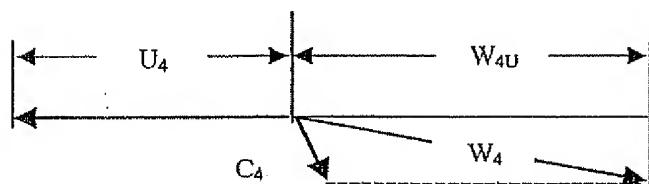
Compressor OutletTurbine InletTurbine Outlet

Fig. 21